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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,658	01/31/2002	Mark Philip D'Evelyn	121655	1463
6147	7590	03/02/2006	EXAMINER	
GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309			LEUNG, JENNIFER A	
			ART UNIT	PAPER NUMBER
			1764	

DATE MAILED: 03/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/683,658

Applicant(s)

D'EVELYN ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 January 2006 and 26 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 104-106, 112, 130, 145 and 146 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 104-106, 112, 130, 145 and 146 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 26, 2006 has been entered.

### ***Response to Amendment***

2. Applicant's amendment submitted on January 3, 2006 has been received and carefully considered. Claims 1-103, 107-111, 113-129 and 131-144 are cancelled. Claims 104-106, 112, 130, 145 and 146 are under consideration.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 104, 105, 112, 130 and 145 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilson et al. (US 3,473,935).

Regarding claim 104, Wilson et al. (FIG. 1, 2) discloses an apparatus comprising: a capsule having an interior surface defining a volume (i.e., closed and sealed capsule 31, defining a chamber; column 2, line 61 to column 3, line 7), wherein the capsule is configured to receive a material and a fluid in the capsule volume (i.e., the capsule is

capable of receiving a material **29** to be crystallized, and water in an amount not exceeding about 6.5 wt percent of the material; column 4, lines 2-20);  
a restraint (i.e., core **16**) having an interior surface defining a chamber for receiving the capsule **31**; and  
an energy source operable to supply thermal energy to the capsule **31** (i.e., a heating element comprising a carbon cylinder **33** proximate to said capsule **31**, and a wattage control system comprising conductors **39** and **40** electrically coupled to said heating element **33**; column 3, lines 45-54).

Because the apparatus is configured to obtain pressures of up to 60,000 atmospheres in the capsule (column 3, lines 43-44) and temperatures of up to about 2000 °C (see Examples I-VI) in the capsule, the fluid (i.e., water) added to the capsule **31** is inherently operable to become supercritical at a predetermined temperature and a predetermined pressure, because water is known to be supercritical above approximately 374 °C and approximately 22.06 MPa.

Regarding claim 105, the restraint **16** is operable to counterbalance the pressure in the capsule **31**, and the restraint **16** being is immobile relative to the capsule **31** while counterbalancing the capsule **31** pressure (i.e., given that water, when heated to the disclosed temperatures under the constant volume of the capsule, inherently expands to thereby pressurize the inside of the capsule to the disclosed pressures; see examples I-III).

Regarding claim 112, Wilson et al. discloses a clamp (i.e., binding rings **11-15**) in contact with the restraint **16**, operable to reduce a pressure load on at least a portion of the restraint **16**.

Regarding claim 130, as defined in section [0032] of the specification, the “pressure response” is the “percent increase in cell pressure divided by the percent increase in press force

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that produces the increased cell pressure, relative to a reference operation condition.” Such are variables of an intended process. The apparatus of Wilson et al. structurally meets the claims because the “pressure response” is not considered an element of the apparatus.

Regarding claim 145, the capsule 31 and the restraint 16 are inherently capable of maintaining a seal to the fluid (i.e., water) at a given internal pressure and at a corresponding temperature, as evidenced by the synthesis of Beryl crystals with the addition of water, under the disclosed temperatures and pressures of Examples I-III. (Clearly, one would not include water in the capsule under the disclosed temperature and pressure conditions if water leaked out of the capsule). Please note that the claimed limitation relating to the fluid and its corresponding pressure within the capsule provides no further patentable weight to the claim because the fluid has not been considered an element of the apparatus.

Instant claims 104, 105, 112, 130 and 145 structurally read on the apparatus of Wilson.

4. Claims 104-106, 112, 130 and 145 are rejected under 35 U.S.C. 102(b) as being anticipated by Buehler (US 2,785,058).

Regarding claim 104, Buehler (FIG. 1-3) discloses an apparatus comprising:

a capsule (i.e., expendable liner 1) having an interior surface defining a volume, the capsule being configured to receive a material and a fluid in the capsule volume (i.e., a quartz material 8 and a fluid comprising an aqueous medium 12), the capsule 1 both is sealable (i.e., by welding of cups 3,4 to cylindrical tube 2 at edges 6,7) and is operable to maintain a seal while the capsule is subject to a predetermined temperature and to a predetermined pressure (i.e., “... liner 1, which is not of itself capable of withstanding the pressures generated in the process but which serves to seal in the aqueous medium so as to prevent leakage,” column 2, lines 36-40);

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a restraint (i.e., tube 14 of pressure-resistant bomb 13) having an interior surface defining a chamber configured to receive the capsule 1, and the restraint 14/13 is responsive to resist a pressure exerted by the capsule 1 against the restraint interior surface and to maintain the chamber at a substantially constant volume (i.e., the bomb 14/13 is a “pressure-resistant vessel” that resists the expansion of liner 1 caused by the pressure generated within the liner 1 during the heating process); and

an energy source (i.e., hot plate 47, heated by electric resistance heaters 48; FIG. 3) operable to supply thermal energy to the capsule 1.

The claimed limitations relating to the fluid within the capsule 1 provide no further patentable weight to the claim, because the fluid is not considered an element of the apparatus, and the recitation of a “supercritical” state for the fluid pertains to an intended use of the apparatus. In any event, Buehler further discloses that the apparatus may be used for carrying out the process of growing quartz crystals, “with the aqueous solution at temperatures and pressures preferably above the critical temperature and critical pressure of the aqueous solution, which critical temperature and pressure are essentially the same as the critical temperature and pressure of water. All parts of the chamber in which the growing takes place are maintained at temperatures preferably above the critical point.” (see column 6, lines 47-55).

Regarding claim 105, the restraint 14/13 is operable to counterbalance pressure in the capsule 1 generated by the fluid in response to thermal energy (i.e., given that the bomb 14/13 is “pressure resistant”), and the restraint 14/13 is immobile relative to the capsule 1 while counterbalancing the capsule pressure (see column 2, line 72 to column 3, line 13).

Regarding claim 106, the apparatus comprises a heating system that includes the energy source (i.e., hot plate 47, heated by electric resistance heaters 48; FIG. 3) and a temperature sensor, wherein the temperature sensor is disposed proximate to the capsule 1 and is operable to sense a temperature of the capsule (i.e., although not illustrated in the figure, the apparatus inherently comprises a temperature sensor, as evidenced by the disclosure of Buehler. “In the apparatus shown in the drawing, it is convenient to measure the temperature differential of the external surface of the bomb at the levels indicated by the broken lines labeled A and B in Figs. 2 and 4,” column 7, line 66 to column 8, line 1).

Regarding claim 112, a clamp (i.e., caps 15, 16 of bomb 13) in contact with the restraint (i.e., tube 14 of bomb 13), wherein the clamp 15/16/13 is operable to reduce a pressure load on at least a portion of the restraint 14/13.

Regarding claim 130, as defined in section [0032] of the specification, the “pressure response” is the “percent increase in cell pressure divided by the percent increase in press force that produces the increased cell pressure, relative to a reference operation condition.” Such are variables of an intended process. The apparatus of Buehler structurally meets the claims because the “pressure response” is not considered an element of the apparatus.

Regarding claim 145, the capsule 1 and the restraint (i.e., tube 14 of bomb 13) are cooperatively configured to maintain a seal to seal in the aqueous medium 12 so as to prevent leakage (see column 2, lines 36-49). Please note that the claimed limitation relating to the fluid and its corresponding pressure within the capsule 1 provides no further patentable weight to the claim because the fluid has not been considered an element of the apparatus.

Instant claims 104-106, 112, 130 and 145 structurally read on the apparatus of Beuhler.

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5. Claim 146 is rejected under 35 U.S.C. 102(b) as being anticipated by Flanigen et al. (US 3,567,643).

Flanigen et al. (Example I) discloses an apparatus comprising:

a capsule having an interior surface defining a volume (i.e., the gold-liner of the “gold-lined reaction vessel”; see also column 4, lines 43-47), the capsule having disposed within the volume an amount of metal material (i.e., aluminum contained in the 0.36 grams of gibbsite, and chromium contained in the 0.273 grams of  $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ ; other suitable metals disclosed in column 4, lines 17-31) and an amount of ammonia (i.e., from the aqueous solution of 0.1 N  $\text{NH}_4\text{Cl}$  and 0.1 N  $\text{NH}_4\text{OH}$ ; other ammonia sources disclosed in column 5, lines 48-71), the capsule both is sealable to maintain an internal pressure (i.e., as disclosed in the Example, the capsule maintains an internal pressure of approximately 20,000 pounds per square inch; see also column 7, lines 51-63), and is functionally capable of maintaining a seal to the amount of ammonia while the capsule is subject to a predetermined temperature (i.e., in the Example, the temperature is approximately 475 °C to 500 °C) and to a pressure in a range of up to about 80 kbar (i.e., the sealed gold capsule/liner meets the claim, because although the 20,000 psi of the Example is less than 80 kbar, the claim recites a range of up to about 80 kbar, meaning that a pressure of 1 atm up to 80 kbar is within the scope of the claim);

a restraint having an interior surface defining a chamber that is configured to receive the capsule and the restraint is responsive to resist a pressure exerted by the capsule against the restraint interior surface and to maintain the chamber at about a constant volume, and wherein the restraint is not operable to provide an active pressure load radially inward toward the capsule (i.e., the reaction vessel which contains the gold liner, being constructed of “high strength,



corrosion-resistant steel in order to withstand the pressures and temperatures encountered in the present process.” see column 4, lines 32-58); and

an energy source (i.e., the auxiliary heater, see Example 1; see also column 7, line 63 to column 8, line 2) operable to supply thermal energy to the capsule.

The recitation of a “supercritical” state for the ammonia provides no further patentable weight to the claim because the particular temperature and pressure of the ammonia within the capsule is a process limitation which depends on the intended use of the apparatus. Furthermore, the use of the apparatus to synthesize a “metal nitride” provides no patentable weight to the claim because it also pertains to an intended use of the apparatus.

Instant claim 146 structurally reads on the apparatus of Flanigen et al.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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6. Claim 106 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson et al. (US 3,473,935) in view of Hall et al. (US 2,947,610).

Wilson et al. discloses a heating system comprising an energy source (i.e., carbon tube 33, electrically coupled to conductors 39 and 40; column 3, lines 45-54). Wilson et al., however, is silent as to the system further comprising a temperature sensor, disposed proximate to the capsule 31 and operable to sense the temperature of the capsule 31. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a temperature sensor to the apparatus of Wilson et al., on the basis of suitability for the intended use, because the examiner takes Official Notice that it is well known in the art to provide temperature sensors to apparatus in order to enable the monitoring and/or controlling of process variables, as evidenced by Hall et al. In particular, Hall et al. (see column 7, lines 18-63) teaches an apparatus, similar to the apparatus of Wilson et al., wherein the temperature in a reaction vessel 32 is determined by fairly conventional means of placing a thermocouple in the reaction vessel and measuring the temperature in the usual manner. Electrical energy at a predetermined rate is then supplied to the apparatus, and the temperature produced by this power is measured by the thermocouple. The same procedure is repeated with different power inputs to produce a calibration curve of power input versus the temperature in the reaction vessel. The temperature within reaction vessel 32 is thus controlled in a “closed loop” fashion according to the power input to the apparatus in conjunction with the calibration curve.

#### ***Response to Arguments***

7. Applicant's arguments filed on January 3, 2006 with respect to claims 104-106, 112, 130, 145 and 146 have been considered but are moot in view of the new ground(s) of rejection. In

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addition, Applicant's arguments with respect to Wilson et al. (US 3,473,935) have been fully considered and are persuasive. Therefore, the rejection of claims 104-106, 112, 130, and 145 under 35 U.S.C. 102(b) as being anticipated by Wilson et al. has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of a different interpretation of the Wilson et al. reference (i.e., the restraint is now designated as core 16, the core being passive and the core functioning to counterbalance any radial expansion of the capsule upon pressurization of the contents of the capsule upon heating).

### ***Conclusion***

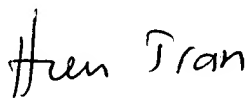
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung  
February 23, 2006



  
**HIEN TRAN**  
**PRIMARY EXAMINER**